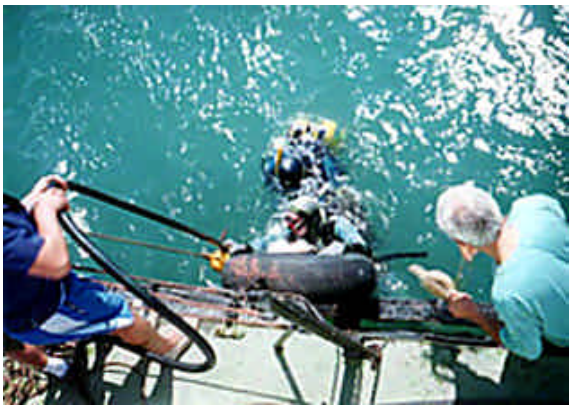
Environmental Management System for Dredging on the Bulgarian Black Sea Coast



Project Title : Environmental Management System (EMS) Related to Dredging Works on the Bulgarian Black Sea Coast
Leader: Black Sea Coast Association (BSCA) (Varna, Bulgaria)
Partner: Ogden Beeman & Associates, Inc. (Portland, OR US)
Location: Black Sea Coast, Bulgaria
Project Duration: July 2000 – January 2001
EcoLinks Project Investment: Total Project Investment: $75,000; EcoLinks Grant Support: $48,600; Project Team Cost Share Contribution: $26,400.

Best Practice: Transferable Solution

This project is a Best Practice because it successfully demonstrated the development of a sound framework for conducting dredging activities with minimal environmental impacts. The project methodology is transferable to other countries in the region and would be especially beneficial in cases where the environmental impacts of dredging activities are not sufficiently considered.

Project Summary

The Ports of Varna and Bourgas on the coast of the Black Sea in Bulgaria are important sites for water transport and trade growth. Improving water trade and transportation in this area would require dredging to deepen and maintain the approach channels and port vicinity and to regenerate the embankment levels. Dredging would stir up the pollutants (i.e., heavy metals and inorganic and organic compounds) embedded in the seabed sediments threatening human health, the tourist industry and the already delicate ecological status of the Black Sea.

Dredging activities need to be conducted in a way that minimizes the suspension and dispersal of contaminants. The purpose of this project was to develop an Environmental Management System (EMS) that provides a framework for conducting environmentally sensitive dredging activities. The EMS developed in this project includes several elements: 1) an assessment of the status of the coastal and seabed environment and dredging in two port areas in Bulgaria, the Port of Varna and the Port of Bourgas; 2) recommendations for strengthening the institutional and legal framework necessary to carry out dredging activities with minimal environmental impact; and 3) an action plan for EMS implementation.

This project generates environmental and economic benefits. Implementing an EMS for dredging on the Black Sea will minimize the environmental impacts of dredging by reducing the suspension and dispersal of contaminants in the water column, and improving the energy efficiency of dredge material removal. Activating an EMS framework for dredging will also improve the coordination of management responsibilities, providing a greater capacity to assure the implementation of environmental policies and laws. Dredging opens up opportunities for economic growth in trade and marine transportation. With the implementation of the EMS developed in this project additional economic benefits are generated including a reduction in dredge disposal costs and the prevention of costs associated with environmental damages.

Project Activities

The purpose of this project was to establish an Environmental Management System (EMS) for dredging in the Black Sea on the Bulgarian coastline around two port sites, the Port of Varna and the Port of Bourgas. To accomplish this, three main activities were conducted:

1. Assessed the different site parameters for dredging

Action: An assessment of site specific dredging needs and seabed composition and conditions was conducted. Existing and anticipated port activities and expected dredging requirements were examined. The trends in ship and cargo type and cargo handling operations were determined. For example, more modern vessels are up to two meters deeper than earlier carriers. Dredging, therefore, must be deep enough to accommodate newer vessels. The regional environmental conditions and marine impacts of Bulgarian dredging operations were determined.

Hydrographic information and data, sediment types, historic dredging activities, available disposal sites, and equipment and resources of Bulgarian dredging companies were determined to identify the specific capacity for EMS dredging on the Bulgarian Black Sea coast.

Product(s): 1) Data on port activities in Varna and Bourgas, dredging requirements, seabed composition and conditions for dredging 2) an assessment of the environmental impacts of dredging in Bulgaria.

2. Created a framework for dredging

Action: EMS framework for dredging was developed and included the following:

The elements of an EMS appropriate for the Bulgarian context were developed. They included: environmental policy; environmental aspects and impacts of dredging; legal requirements; objectives and targets; environmental management programs; structure and responsibility; training, awareness and competency; communications; EMS documentation; document control; operational control; emergency response; monitoring and measurement; non-conformance and corrective/prevention action; record keeping; dredging EMS auditing; and management review. A process for outlining information exchange and clarification of roles and responsibilities of involved parties necessary for implementing a dredging EMS was developed. An assessment of the existing framework for dredging activities was conducted and gaps were identified. Based on the results of this assessment, an action plan was then established for initiating the dredging EMS.

Product(s): 1) An EMS action plan for introducing EMS dredging 2) A report, "Reducing Contaminated Sediment Impacts at Dredging Areas" by B. Savov, V Pentchev, and M. Johnson completed and presented at the Second International Conference on Port Development and Coastal Environment.

3. Finalized EMS dredging protocol

Action: Guidelines and recommendations for implementing a dredging EMS were developed including an outline of system requirements. Coordination activities with local dredging contractors were initiated. The results of the project were shared with interested Bulgarian companies and representatives of governmental bodies including the Ministry of Environment and Waters, and port administrators.

Product(s): 1) Systems requirements including a dredging contractors EMS policy; a dredging EMS implementation plan; an EMS computer-based manual outlining procedures and guidelines; an outline of technical requirements such as machinery and software; description of monitoring requirements 2) An EMS computer program that facilitates record keeping regarding hydrographic data, dredging records, sediment data, and environmental monitoring data 3) An EMS Training Program that trains relevant personnel in the environmental aspects of dredging operations, EMS implementation and the operation and quality control of the EMS computer software 4) Workshop introducing project results to major Bulgarian companies and administrators 5) Special report titled, "A Contribution to Environmental Management Strategy of Dredging Works on Bulgarian Black Sea Coast" that was presented at the International Conference "Black Sea-2000", November 6-8, 2000, Varna, Bulgaria.

Project Benefits

This project generates several benefits from the development and implementation of a dredging EMS. Important networks were established that enhance the

implementation capacity of an EMS. Dredging according to the EMS guidelines established in this project will reduce the environmental impacts and costs of dredging.

Capacity Building Benefits

Through workshops and negotiations initiated and organized through this project, productive and cooperative relationships were established between parties involved in or concerned about dredging activities. Early preparation to establish relationships between those advocating an EMS approach and those who will implement it improved the success of this project. Furthermore, a dredging EMS will reduce conflicts between dredging contractors, central and local authorities and non-governmental organizations because it addresses the environmental impacts of dredging and provides a multi-institutional framework for conducting dredging activities. The results of this project were shared with different stakeholders and served to increase awareness about the development and implementation of a dredging EMS and the environmental and economic benefits it can generate.

Environmental Benefits

With the implementation of the dredging EMS developed in this project, several environmental benefits are generated. They are listed below.

- An EMS applied to dredging activities reduces the spread of sediment pollutants (e.g., lead, copper, zinc, cadmium, nickel, chromium, arsenic, mercury) into the water column and across the seabed where they interrupt important marine life cycles. The visibility of the suspension-clouds is decreased to a distance of approximately 50 meters.
- Reducing the water content of the dredged material reduces the amount of dredge waste. An EMS improves the discharge of return water by 80% of its present level. This reduces the amount of energy needed to process dredged material and puts less impact on disposal sites. For example, the concentration of dredge material removed is improved by 10%.
- The energy efficiency of the dredge removal process is improved.
- There is better management across institutions. This improves compliance with environmental laws and policies including sustainable coastal zone development.
- Generating the EMS itself provided opportunities for building important networks and generating and sharing information that is needed to reduce the environmental impacts of dredging.

Economic Benefits

Several economic benefits can be derived from implementing the dredging EMS developed in this project. They include:

- A reduction in over-dredge, promoting a decrease in the costs of dredging works;
- A reduction in costs for dredge disposal since the water content of the dredged material is lessened through the application of an EMS;

- A reduction in costs associated with non-compliance with environmental laws and regulations; and
- Improved bidding status for companies that conduct dredging activities based on an EMS.

Lessons Learned

The following lessons were learned during this project:

- Transferring technological experience from one country to another (Bulgaria and the United States in this case) requires adjustments for a different legislative framework and different standardization levels by extensive exchange of expertise and regional knowledge.
- Flexibility and strong cooperation amongst the involved parties is needed to alleviate the difficulties associated with coordinating project activities in an unstable political, economic, and social environment.
- Bulgarian dredging companies could benefit greatly from expertise on EMS design and implementation, additional equipment to do monitoring, improved dredging vessels that are less damaging to the marine environment, and financing to support these investments.
- A serious challenge to implementing the EMS developed in this project is acquiring sufficient financing to cover the costs of equipment, software, hardware, etc.

Contact Information

Project Leader
Black Sea Coastal Association (BSCA)
11-A, Kr. Mirski Str., Suite 34,
9000 Varna, Bulgaria
Tel/Fax: +359-52-602-657
E-mail: bcaint@mbox.digsys.bg
Contact Person: Valeri Pentchev, Vice Chairman of the Board

Project Partners
Ogden Beeman & Associates, Inc.
421 SW Sixth Avenue, Suite 1350
Portland, OR 97204-1612 USA
Tel: 1-503-223-8254
Fax: 1-503-222-0657
E-mail: obai@obai.com
Contact Person: Margaret Johnson (Vice President) and Cynthia Lowe